

MAMMALS



Objectives

- Know the ***characteristics*** of mammals.
- Know the characteristics of the ***sub-classes of mammals***.
- Be able to explain how mammal ***digestive systems*** work.
- Understand the relationship between ***body size and food consumption***.
- Understand mammal ***foot structures***.
- Know the differences between ***antlers and horns***.
- Be able to differentiate between males and females of common species.
- Have basic knowledge of the main ***indicator species***.
- Know the ***characteristics*** of the various ***mammal orders***.



Characteristics

The word '**Mammal**' comes from the term '**Mammary Gland**'.
Mammary glands are unique to mammals.

What is a Mammary Gland?

Glandular milk secreting organs of the ***female***. (Rudimentary in males)



Characteristics

What advantages do Mammary Glands provide ?

- Allows the mother to look after and ***feed her babies for a longer period.***
- Protects infants from the dangers of ***fending for themselves.***
- Makes the ***transition into adulthood*** much easier.



Characteristics

Distinguishing features of Mammals

- Females have ***milk producing mammary glands***.
- The ***body is covered in hair*** (at least partially) at some stage in their development.
- They are ***endothermic*** (warm blooded) and able to regulate their body temperature.
- They have an ***external ear structure***.
- ***Three ear ossicles*** (Small bones).
- A ***four chambered heart*** (crocodiles also have this).

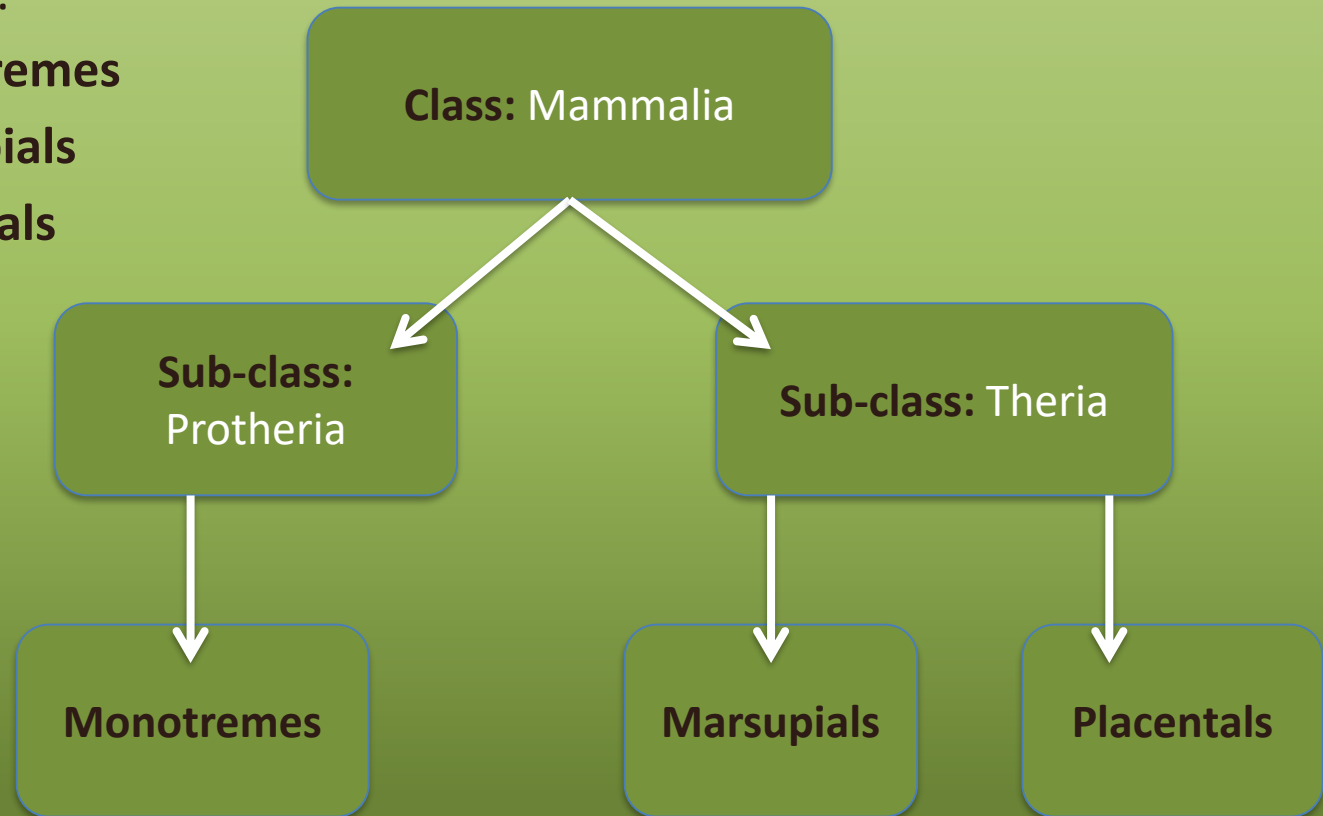


Characteristics

The Sub-classes Of Mammals

Mammals are divided into **three groups** depending on the way they reproduce.

- **Monotremes**
- **Marsupials**
- **Placentals**



Characteristics

Before we carry on here are some important words that you need to know and understand.....

- ***Lactation*** – The period that milk is produced by the mammary glands.
- ***Gestation*** – A pregnancy
- ***Embryo*** – An animal or human ***before it is born***, when it is beginning to develop and grow.
- ***Viviparous*** – An animal that bears ***live young*** and does not carry or lay eggs.
- ***Oviparous*** – An animal that ***lays eggs***.
- ***Placenta*** – A vascular organ that develops inside the uterus of most pregnant mammals to ***supply food and oxygen to the foetus*** through the umbilical cord. It is expelled after birth.

Characteristics

1. Monotremata – Monotremes

- *Egg laying mammals* (Oviparous).
- The most *primitive* of living mammals.
- They have *no gestation period*.
- The developing embryo gets its nutrients that are stored in the egg.
- Monotremes rear their hatched young on *milk*.



Characteristics

- Eggs are carried in a ***pouch*** on the abdomen or kept warm in a ***nest***.
- There are ***no monotremes in Africa***.
- All are found in ***Australasia***.

Examples: Duck-billed Platypus, Echidna (Spiny Anteater)



Characteristics

2. Marsupiala– Marsupials

- ***Pouched mammals*** with a ***long lactation period***.
- They have an ***abdominal pouch*** called a ***marsupium*** where they rear their young.
- They have a ***very primitive placenta*** (Yolk-sac placenta).
- The gestation period is ***very short***.
- All give birth to ***underdeveloped young*** that are effectively still embryos.



Characteristics

Marsupials

- The young marsupial ***crawls into the pouch*** where they complete their development.
- They attach to a mammary gland nipple and are ***nourished by milk***.
- Marsupials are confined to ***Australasia*** and ***South America***.

Examples: Opossums, Kangaroos, Koalas, Numbats, Wombats etc.



Characteristics

3. Placentals – Placentals

- These are ***viviparous*** mammals with a ***prolonged gestation period***.
- They have an ***advanced placenta***.
- ***19*** of the ***21 orders*** of mammals are placentals.
- The most ***diverse group*** of mammals.

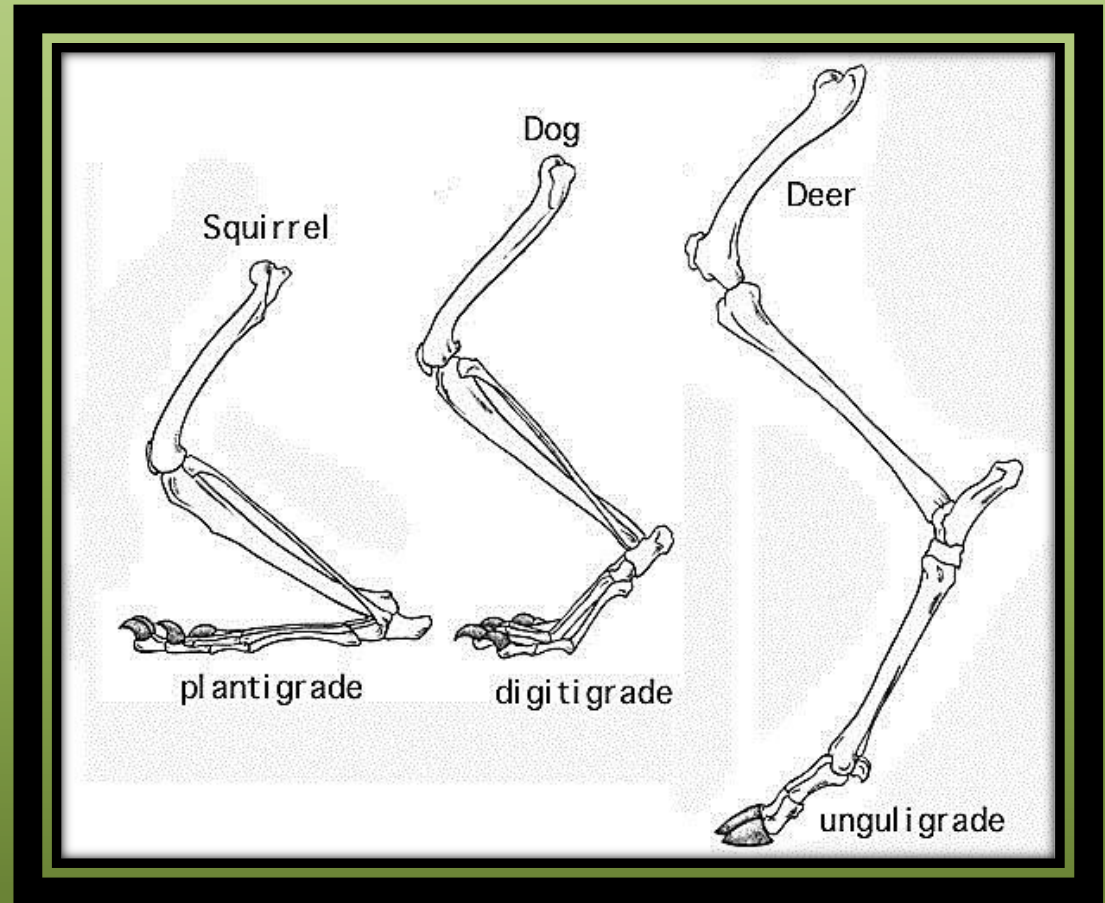
Examples: Antelope, Elephants, Baboons, Bats, Lions and Pigs etc.



Foot Structures

All mammals can be divided into three groups based on their foot posture while standing.

- Plantigrade
- Digitigrade
- Unguligrade



Foot Structures

Plantigrade:

- This is the ***most primitive*** type of foot structure.
- Standing or walking on the ***whole length of the foot***.
- **Used by:** Man, Apes, Primates, Bears, Insectivores & Rodents etc.



Foot Structures

Digitigrade:

- Slightly *more advanced than plantigrade*.
- The heel and instep are raised so that *only the digits touch the ground*.
- Enables *silent movement*.
- **Used by:** Predatory mammals of the dog, cat, hyaena and mongoose families etc.



Foot Structures



Foot Structures

Unguligrade:

- This is an ***advanced*** foot structure.
- These animals are collectively called ***ungulates***.
- An adaptation to ***running***.
- These animals stand on the ***tips of their toes***.
- **Used by:** Antelope, Horses, Pigs, Deer etc.



Foot Structures

Odd-toed Ungulates:

Order: Perissodactyla

- These animals have either a ***single toe***, as in zebra, or ***three toes together*** with a large middle toe as in rhino.



Foot Structures

Even-toed Ungulates:

Order: Ruminantia (Two toes on each foot)

- Antelope and Buffalo
- Giraffe

Order: Suiformes (Two toes on each foot)

- Warthogs
- Bushpigs

Order: Whippomorpha (Four toes on each foot)

- Hippo



Foot Structures

Near Ungulates:

- Elephant
- Hyrax (Dassie)

Characteristics of near ungulates

- They are **plantigrade**.
- They have **toenails** rather than hooves.
- They have **mammary glands between the forelegs**.
- They have the **same type of placenta** and womb.
- The upper incisors are reduced in number and modified as **tusks**.
- The molars have **transverse ridges**.



Digestive Systems

In mammals there are three basic nutrition groups:

Insectivores

- *Small*, opportunistic mammals.
- Feed on a wide variety of small *invertebrates*.
- The *intestinal tract is short* as the diet gets very little fibre.

Carnivores

- These feed mainly on herbivores.
- Their protein diet is easily digested so the *digestive tract is short* and the *cecum is small or absent*.

Herbivores

- Generally have *long digestive tracts*.
- Must eat a considerable amount of food to survive.



Digestive Systems

The Ungulate and Near –ungulate mammals can be further classified according to their digestive systems:

- Hindgut Fermenters
- Ruminants

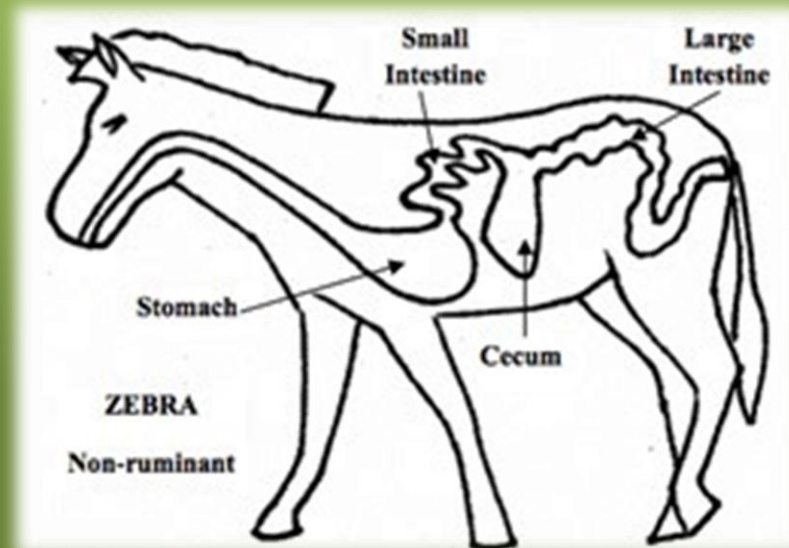
Who knows what the difference is?



Digestive Systems

Hindgut Fermenters:

- In some herbivores ***the gut*** has a large side pocket called the ***cecum***.
- The cecum is a ***fermentation chamber*** and ***absorptive area***.
- Food is completely ***digested in the stomach*** from where it moves to the ***large intestine*** and ***cecum*** where ***bacteria ferment the cellulose***.
- Protein digestion in these animals is ***less effective*** than in ruminants, but more than ***double the amount of food*** can pass through the digestive tract during the same period.



Digestive Systems

Hindgut Fermenters:

- Hindgut fermenters live on a diet which is too ***low in quality*** and protein to support a ruminant.
- In areas where there is limited food supply, a ruminant will usually survive longer than a hindgut fermenter.
- Hares and some rodents often eat their ***faecal pellet***, this gives the food a second chance to pass through the digestive system. Known as ***coprophagy***.

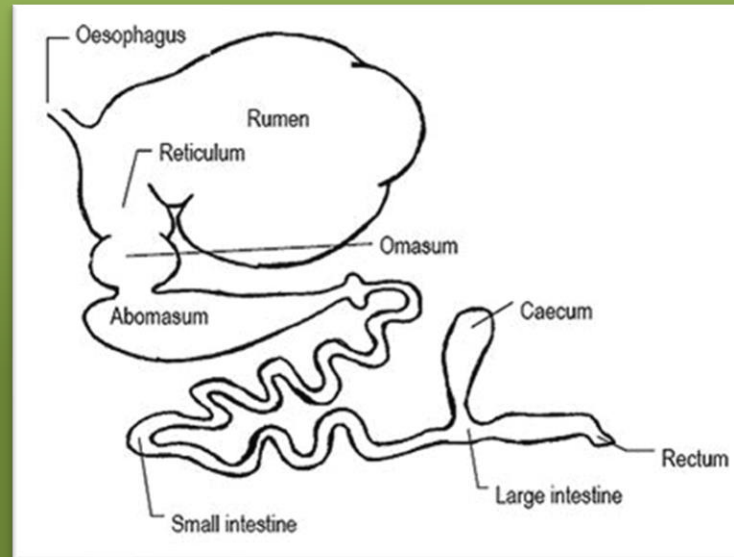
Examples: Zebras, Rhinos, Warthog, Bushpig, Elephant, Hyrax, Hares etc.



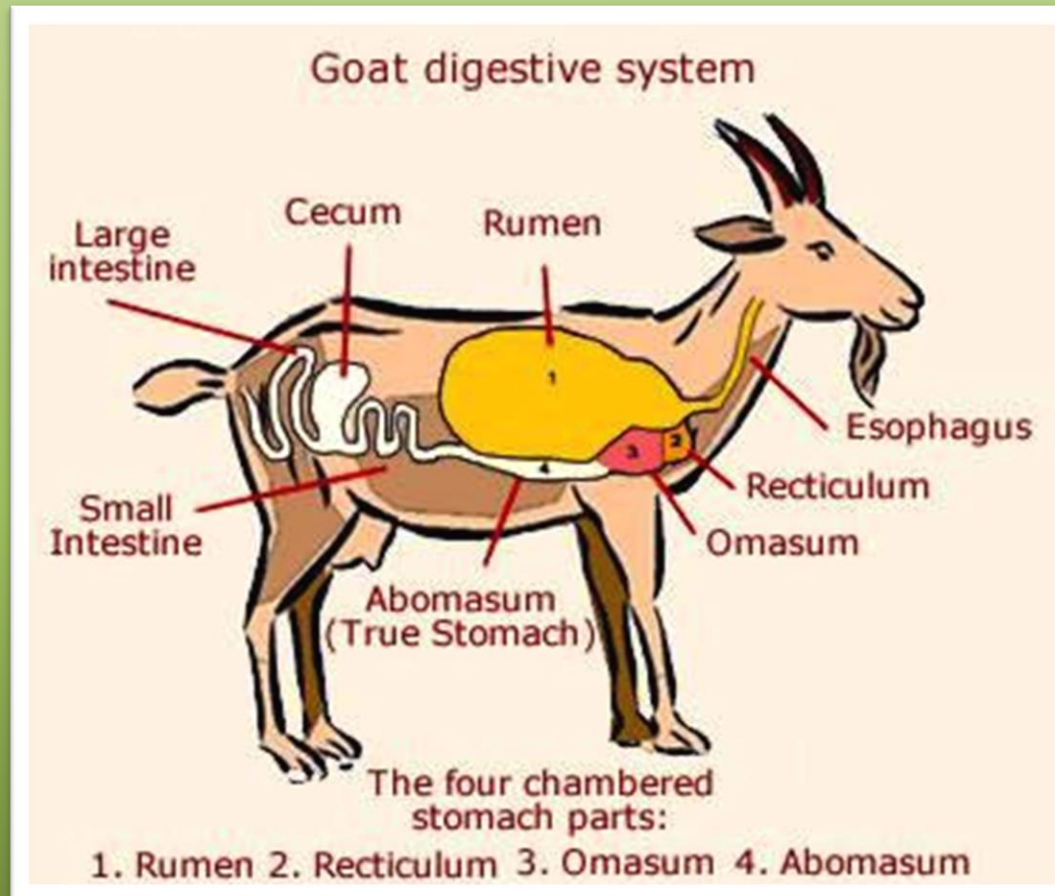
Digestive Systems

Ruminants:

- These animals have a **four chambered stomach**.
- Ingested food moves directly to the first chamber called the **rumen**.
- The food ferments in the rumen and is later **regurgitated** to be chewed and mixed with saliva.
- The '**Cud ball**' is then passed back to the second stomach chamber, the **reticulum**. This food now bypasses the rumen.
- The digestive process then continues in the third chamber, the **omasum**, and completed in the fourth chamber, the **abomasum**.



Digestive Systems



Digestive Systems

Ruminants:

- Ruminants can be grouped into – ***Browsers, grazers and mixed feeders.***
- The rumen contains ***bacteria and protozoa*** which have the ***enzymes*** needed to break down ***indigestible*** cellulose.
- The waste products of these micro organisms is made up of volatile ***fatty acids***. These fatty acids are absorbed by the ruminant and are its ***main source of energy.***
- Small ruminants are ***selective feeders***, choosing food that contains very little ***cellulose*** such as berries and fresh shoots.



Digestive Systems

Ruminants:

- **Large ruminants** like sable and buffalo have **very large rumens**.
- These animals are **bulk grazers** that take food high in cellulose and with little cell content or juiciness.
- These ruminants have much larger rumens than usual to get as much benefit as possible from **poor quality food**.
- A 900kg buffalo has a stomach of **+/- 135kg**.
- Ruminants produce a large amount of **saliva** that contains **bicarbonate** which prevents the pH from dropping too low.



Digestive Systems

Ruminants:

- A drop in the pH would cause the death of the ***stomach microbes***.
- Remember... The structural ***carbohydrates*** are of little use to the ruminant, but are used by the ***microbes***.
- ***Without the microbes the ruminant would not be able to digest its food and would die.***



R.M. Tippet

Digestive Systems

The Hippo digestive system:

- Hippos are unusual because they have ***foregut fermentation*** but are ***not ruminants***.
- Hippos are ***selective grazers***, preferring short green grass.
- Hippos have a ***slow digestive process***.
- The food retention time is very long which gives them a fairly ***thorough digestion***, with relatively little waste.



The Metabolic Rate

Body size and food consumption:

- *The smaller the mammal the greater the metabolic rate and the more it must eat relative to its body size.*
- A 70gram Bushveld Gerbil will consume **five times** more food per gram of body weight than a 10 kg Jackal and **thirty times** more food than a 5000kg Elephant.
- *Small mammals* like shrews, bats and mice **must spend far more time foraging and eating than in large mammals.**
- The smallest shrews that weigh 2 grams may **eat more than their body weight each day.** They will starve to death in a few hours if deprived of food.
- A large predator can remain fat and healthy with only **one meal every few days.**



Diet – What do mammals eat?

- **Ruminants** - Animals with a ***four chambered stomach*** are ***herbivores*** and may be selective or mixed feeders. **Examples:** Antelope, buffalo, giraffe.
- **Hindgut Fermenters** - Can cope with eating larger quantities of ***less nutritious*** vegetation. **Examples:** Zebra, white rhino, warthog etc.
- **Bulk Grazers** - ***Not selective*** about the grass they eat. **Examples:** Zebra, White rhino, buffalo, sable etc.
- **Selective grazers** – Animals that only eat ***specific*** kinds of grass or vegetation. **Examples:** Blesbok, Blue wildebeest, Tsessebe, Common Reedbuck, Warthog etc.



Diet – What do mammals eat?

- **Mixed Feeders** – *Herbivore* animals that may **graze, browse or eat bulbs, fruit etc.** **Examples:** Bushbuck, Duikers, Eland, Elephant, Nyala, Steenbok etc.
- **Browsers** – Eat mostly **leaves**. **Examples:** Giraffe, Kudu, Black Rhino etc.
- **Fructivores** – Eat **fruit**. **Examples:** Fruit bats
- **Omnivores** – Animals with a **varied diet**. **Examples:** Baboons, Civet, Bushpig etc.



Diet – What do mammals eat?

- **Piscivores** – A diet mainly of *fish*. **Example:** Spotted-necked Otter
- **Carnivores** – Animals that eat *meat*. **Examples:** Lion, Leopard, Cheetah, Wild dogs, Hyaena, Caracal etc.
- **Insectivores** – Eat *Insects*. **Examples:** Aardvark, Pangolin, Shrews, Golden Moles and hedgehogs.



R.M. Tippet



Horns and Antlers

What is the difference between Horns and Antlers ?

These two are often confused, but are actually very different.

It is important that you ***understand the differences*** because many foreign visitors (Your guests) do not.



Horns and Antlers

Antlers

- There are ***no native African*** animals that carry antlers.
- Animals with antlers like deer, Elk etc. come from Northern hemisphere countries.
- These animals are of the ***family – Cervidae***.
- Only the ***males carry antlers*** (Except Caribou).
- The ***shape varies*** amongst the species.
- Antlers grow from ***pedicels*** (bony supporting structures on the head).
- The grown antlers are basically ***cemented to the pedicels*** on top of the skull. They are ***not fused to the skull*** like horns are.



Horns and Antlers

Antlers

- Growing antlers are covered by a furry skin called **velvet**.
- Once the antlers harden the velvet starts to die and falls off.
- Increased **testosterone** levels induces antlers to grow, but in winter the reduced daylight lowers testosterone production. This **causes the antlers to be shed**.
- **Examples** – Moose, Caribou, Elk, Deer, Reindeer etc.



Horns and Antlers

Horns

- Horns occur in ***males of all species*** in the family Bovidae.
- The ***females of some species*** also carry horns.
- Unlike antlers, horns are ***never branched***.
- Horns are ***never shed*** and become ***fixed to the skull***.
- Like antlers, the horns are ***used in fights and displays***.
- ***Both sexes have horns in the larger species***. This is because larger species are more likely to stand and fight off a predator.
- Where both sexes have horns the males are usually larger, thicker and heavier.





R.M.

The Mammal Orders of Southern Africa



Order: Eulipotyphla (Insectivora)

The insectivores are the ***most primitive*** of all placental mammals.

They have the following primitive characteristics:

- A ***small brain***.
 - ***Not many wrinkles*** to increase the surface area.
 - They have ***primitive teeth***.
 - They have ***primitive auditory*** and ***collar bones***.
 - They are ***plantigrade***.
-
- They are ***small mammals*** with ***narrow mobile snouts***.
 - They have ***five digits*** on each foot and their ***eyes and ears*** are relatively ***small***.



Order: Eulipotyphla (Insectivora)

1. The shrews (Family : Soricidae)

- There are **15 species** in Southern Africa.
- They are **small** and **secretive**.
- Posses **long, pointed and narrow muzzles**.
- They have **small eyes** and **poor vision**.
- Senses of **smell** and **hearing is exceptional**.
- Born with their **final set of teeth**.
- They are **terrestrial** and spend most of their time **under vegetation**.
- Feed mostly on **invertebrates** and **carrion**, but some also eat seeds, nuts and other plant material.



Order: Eulipotyphla (Insectivora)

2. Southern African Hedgehog (Family : Erinaceidae)

- There is only one species in Southern Africa.
- The whole body-plan is primitive except the spines and associated muscles.
- Ears and eyes are well developed.
- They have a long snout with a mobile tip.
- Powerful legs and strong claws.
- The distinctive spines are modified hairs.
- The spines are hollow and filled with air.
- Protect themselves by curling up into a ball.
- The skin is oversized and has powerful muscles underneath.
- They feed mainly on arthropods and carrion.



Order: Eulipotyphla (Insectivora)

3. The Golden Moles (Family : Chrysochloridae)

- There are **15 species** in Southern Africa.
- Small, **solitary, burrowing** mammals.
- Most of their time is spent burrowing for food.
- Short limbs with **strong digging claws**.
- There is **no visible tail**.
- The **eyes are rudimentary** and hidden under the skin.
- **Ear openings are covered with fur**.
- Nostrils are shielded by a **leathery pad**.
- They are very **sensitive to vibrations**.
- They dig **elaborate burrow systems**.
- If sections of the burrow are destroyed they can **orientate** themselves and construct new tunnels to link up with the existing ones.
- They feed almost entirely on **invertebrates**.



Order : Macroscelidae

The Elephant Shrews (Family : Macroscelididae)

- There is only ***one family*** in this order and they only occur in Africa.
- There are ***seven species*** of elephant shrews in Southern Africa.
- ***Secretive*** and ***seldom seen***.
- ***Purely terrestrial*** with long legs.
- The ***hind legs*** are much longer than the front legs. (***For jumping***)
- They have ***long snouts*** and ***large eyes***.
- They have ***long*** rat-like ***tails***.
- Many clear, maintain and defend ***complex trail networks***.
- Trails allow them to travel easily and quickly.



Order: Macroscelidae

Zanj Giant Elephant Shrew (*Rhynchocyon petersi*)

- A *rare* species from coastal areas in *Tanzania*.
- Almost *60cm* in length.



Order : Lagomorpha

Hares and Rabbits (Family : Leporidae)



- This order is represented by ***one family in Southern Africa.***
- There are ***seven species*** in Southern Africa.
- They were originally classified as rodents due to their ***gnawing incisors.***
- They differ from rodents in having a ***second pair of peg-like incisors.***
- ***Long hind legs*** are adapted for running.
- ***Ears are very large*** and mobile.
- ***Large eyes***, adapted to dim light.
- The ***fur is long and soft*** and the ***feet are covered by fur.***
- Nostrils can be opened and closed with a ***skin fold.***
- All are ***herbivorous.***
- They commonly practice ***coprophagy.***



Order: Rodentia



The Rodents

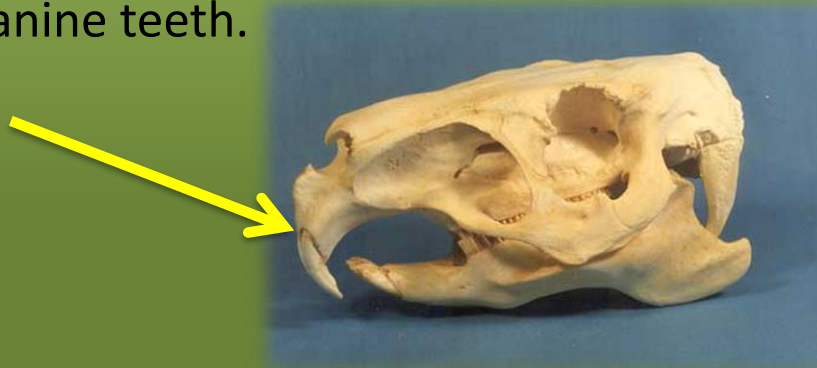
A very diverse group of mammals with over 100 species in Southern Africa.

They are split into two Sub-orders:

Sub-order : **Histricognathi** – Porcupines, Canerats, Mole-rats & Dassie rat.

Sub-order : **Sciurognathi** – Dormice, Squirrels, Springhares, Rats & Mice.

- The Southern African Porcupine is the largest rodent in Africa.
- Rodents are the most successful order of all living mammals.
- Most are small with short limbs and a tail.
- They have one pair of constantly growing incisors.
- They do not have canine teeth.



Order: Rodentia

The Rodents

- Some have ***cheek pouches*** that allow them to build up large stores of food.
- Senses of ***smell and hearing are well developed***.
- Whiskers (***vibrissae***) are long and touch sensitive.
- Most are ***plantigrade***.
- They have highly developed ***reproductive strategies***.
- Most are ***herbivores*** while some can be partly omnivorous.
- ***Coprophagy*** is common in rodents.



Order: Hyrracoïdae

The Hyraxes / Dassies (Family : Procaviidae)

- This order has just ***one family***.
- There are ***three species*** in Southern Africa
- They are smallish, ***solidly built*** animals with ***stumpy tails***.
- The feet have ***rubbery pads*** that contain ***sweat glands***.
- There are ***four digits on the front feet*** and ***three on the back feet***.
- All digits end with ***nails*** except the inner digits on the hind feet which have claws.



Order: Hyrracoïdae

The Hyraxes / Dassies (Family : Procaviidae)

- They have one ***pair of upper incisors*** and ***two pairs of lower incisors***.
- They have a ***dorsal gland*** surrounded by a circle of hair that stiffens when the animal is excited.
- They are ***herbivores*** that crop plants with their ***molars*** instead of their incisors.
- They have a ***poor regulation of body temperature***.
- They have highly ***efficient kidneys*** that allow them to function with very little water.
- Their ***urea is concentrated*** and consists of un-dissolved calcium carbonate.



Order: Chiroptera

Bats

There are *two Sub-orders* :

Megachiroptera – Fruit eating bats – 1 family with 8 species

Microchiroptera – Insect eating bats – 6 families with at least 68 species.

There is a third sub-order – the blood drinking bats. None occur in Africa.

- Bat *wings are membranes made up of skin, elastic tissue and muscle.*
- The *legs, arms and fingers are all attached* to the wing membranes.
- Any holes in the wings heal within a few weeks and broken finger bones mend quite quickly.



Order: Chiroptera

Bats

- Bats hang or ***cling upside down*** when at rest with the hind limbs acting as a hook.
- Bats can ***lock the digits of their hind feet*** to prevent falling.
- Bats are ***not blind*** and some have ***well developed sight***.
- The senses of ***smell and hearing are acute***.
- All bats have incisors, canines, premolars and molars.
- Insect eating bats have ***molars with sharp crests*** while the molars of fruit bats are flat.
- All bats have a ***clawed thumb***.



Order: Chiroptera

Bats

- ***Tails are very variable*** and may be long to almost absent.
- The tail may be either partially or totally ***enclosed by the membrane***.
- Some have ***large ears*** and nose ***leaves***.
- Due to their large skin area ***a lot of body heat is lost***. This is compensated for by intense feeding, sleeping in clusters and hibernation.



Order : Chiroptera

Fruit Eating Bats (Suborder : Megachiroptera)

- ***Fruit eaters*** but some species also eat ***flowers, buds and nectar***.
- Some trees like the ***Sausage tree*** (*Kigelia africana*) rely on fruit bats for ***pollination***.
- Many trees rely on fruit bats for seed ***dispersal***.
- Meals are ***digested very quickly*** and can be excreted in flight.
- Fruit bats are ***generally larger*** than insectivorous bats.
- They have ***fox-like faces*** with tubular snouts and pointed ears.



Order : Chiroptera

Fruit Eating Bats (Suborder : Megachiroptera)

- They have ***two claws on each wing*** for clambering in trees and handling food.
- Amongst fruit bats, only the ***Egyptian Fruit Bat (Rousettus aegyptiacus)*** uses ***echo location***.
- Territorial males use ***vocalisations*** to ***advertise their presence to females***.
- Females give birth to ***one pup per-season*** in the summer.
- The female ***will carry her baby*** on her nightly excursions.



Order: Chiroptera

Insect Eating Bats (Suborder : Microchiroptera)

- Generally far *smaller than fruit bats*.
- Their *echolocation is highly evolved* and sophisticated.
- They also *use their eyes to see* while in flight.
- Most bat echolocation is *beyond our level of hearing*.
- The *nose leaves* direct, focus and *transmit* the *echolocation pulses*.
- The *ears receive the pulse echoes*.
- Bad tasting insects warn bats off with ultrasonic clicks.
- Some moths can jam the sonar by noises that mimic the echo of a large solid object.



Order : Chiroptera

Insect Eating Bats (Suborder : Microchiroptera)

- Insect eating bats **consume quarter of their body weight** in a night.
- A single **6g bat** can eat as many as **600 mosquitoes in one hour!!**
- Insectivorous bats can live for **25 years** or more.
- The largest insect eating bat species in Southern Africa is **Commerson's Leaf-nosed Bat** (*Hipposideros commersoni*). It can weigh **180g** and attain a wingspan of **60cm**.
- The smallest Southern African species is the **Banana Bat** (*Pipistrellus nanus*) which only weighs **3-5 g**.



Order: Primates

This order is divided into two sub-orders:

Sub-order : Haplorhini – Simple nosed true primates (**Simians**) – Man, Apes, Monkeys, Baboons.

Sub-order : Strepsihini – Turned nose ‘Early Monkeys’ (**Prosimians**) – Galagos, Lemurs, Pottos, Aye-ayes.



Order: Primates

Generally this order is characterised by:

- ***Flattened nails on the finger tips.***
- The presence of ***toes rather than claws.***
- The ability to ***move individual digits.***
- An ***opposing thumb and a big toe*** that allow objects to be grasped.



Jana Beets

Order: Primates

Galagos / Bushbabies (Family : Galagonidae)

- There are **3 species** found in Southern Africa: Lesser Galago, Grant's Galago & Greater Galago.
- Members of this family have a ***strong sense of smell***.
- Unlike higher primates, their ***faces are covered with hair***.
- Their ***tails are longer than their bodies***.
- They have ***large eyes***.
- The ***hind limbs are much larger than the fore limbs***. Adapted for leaping.
- The sense of ***hearing is acute***.



Order: Primates

Galagos / Bushbabies (Family : Galagonidae)

- ***Incapable of moving their eyes*** in the sockets, Compensated for by a ***flexible neck***.
- Galagos have a ***'tooth comb'*** formed by the two lower incisors and the two canines that ***point forward***. Used to scoop gum out of tree bark. It is also important in ***grooming***.
- The ***underside of the tongue*** has ***sharpened projections*** that are used to clean the tooth comb.



Order: Primates

Baboons and Monkeys (Family : Cercopithecines)



- Southern African species are Chacma baboon, Vervet Monkey, Sykes's Monkey (Samango Monkey).
- They have the **same dental formula as humans** and have **powerful jaws**.
- Some species have **well developed canines**.
- There are **five digits on all feet**.
- First digit on hands and feet is **opposable**.
- The hind feet are **plantigrade**.
- Monkeys have **rounded heads** with moderately long muzzles.
- The Chacma baboon has a very **well developed muzzle**.



Order: Primates

Baboons and Monkeys (Family : Cercopithecines)

- **Nostrils** are *close together* and *point downwards*.
- They *do not have prehensile tails*.
- They have **cheek pouches** that can hold the same amount of food as their stomachs!
- Baboons have hardened tissue on their rumps called **Ischial callosities**. These are brightly coloured and play a role in reproductive behaviour.



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Order: Carnívora

Characteristics of the order:

- Carnivores are **animal product eaters**. They may consume any part of another animal, not just meat.
- All carnivores have **carnassial teeth**. These are the last upper pre-molar and the first lower molar.
- Carnassial teeth are used to **cut and slice**.
- All carnivores are characterised by the **fusion of bones in the foot. (Scapho-lunar bone)**.
- This fusion provides strengthening for **climbing** and **grappling prey**.
- All species except Hyaenas have an elongate, bony structure in the penis called a **baculum**. Used to prolong copulation.



Order : Carnívora

The Cats (Family : Felidae)

- The ***most carnivorous members of the order***.
- They have ***rounded heads***.
- They have ***digitigrade feet*** and ***retractile claws***. The cheetah is an exception as it has ***semi-retractile*** claws.
- They have ***large eyes*** with ***binocular vision*** and some ability to see colour.
- The eyes are well adapted to ***low light levels***.
- The sense of ***hearing is acute***.
- The sense of ***smell is less developed*** than in canids (dogs).
- Facial ***vibrissae*** are long, stiff and very sensitive.
- The tongue is coated with sharp, ***pointed papillae*** that lacerate food and aid in grooming.



Order : Carnívora

The Dogs (Family : Canidae)

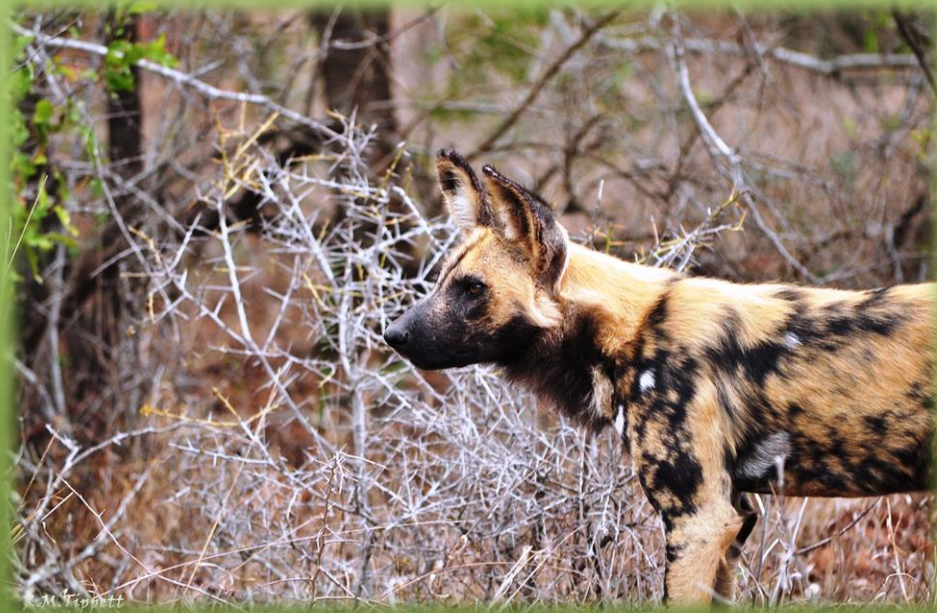
- Members of this family include Jackals, Foxes, African Wild Dog, Wolves, Coyotes etc.
- All members have **long legs**.
- They have **digitigrade feet** with five toes on the front foot and **non-retractile claws**.
- **Long muzzles** with well developed jaws.
- They have **bushy tails** and **conspicuous ears**.
- They have **flattened molars** in front of the carnassials, indicating the diet is **not purely carnivorous**.
- **Copulation is long** due to erectile folds on the penis that prevent retraction by the male. (**Baculum**)



Order : Carnívora

The Dogs (Family : Canidae)

- The African Wild Dog (*Lycaon pictus*) is the least typical member of the group in that it is ***purely carnivorous***, has a ***short muzzle*** and only ***four digits on the front foot***.



Order : Carnívora

The Hyaenas (Family : Hyaenidae)

- All hyaenas have **large ears** with **acute hearing**.
- They have thickset and **extremely powerful muzzles**.
- They have **digitigrade feet** with **non-retractile claws**.
- All hyaenas have an **anal pouch** between the anus and the base of the tail.
- This pouch can be turned **inside out** and discharges **two secretions** from different glands.
- They most closely **resemble dogs**, but their **closest relative is the mongoose**.
- They are adept **scavengers** but are also **successful hunters**.



Order : Carnívora

The Aardwolf (Family : Protelidae)

- This is a ***shy, nocturnal*** animal that is seldom seen.
- It feed mainly on ***harvester termites*** that it locates by sound.
- It closely resembles the striped hyaena ,but is much smaller.
- The fur is longish and coarse.
- The jaws and teeth are ***weakly developed***.
- ***Hearing is acute*** and the ears are large and pointed.



Order : Carnívora

Civets and Genets (Family : Viverridae)

Mongoose and Meerkat (Family : Herpestidae)

- By far the most ***diverse*** of all carnivore families.
- Some ***features are similar to cats***, but they have shorter legs, longer muzzles and don't have rounded heads.
- Almost all have ***well developed anal glands***.
- Feet may vary from ***digitigrade*** to ***near-plantigrade***.
- Claws may be ***retractile or non-retractile***.
- Most are ***omnivores*** with relatively small canines.
- They have ***excellent vision and hearing***.



Order : Carnívora

Badgers and relatives (Family : Mustelidae)

- Local species include the Honey badger, Striped weasel, Striped polecat, Cape clawless otter and Spotted-necked otter.
- All members of this family have **long bodies** and **short legs**.
- **Anal glands** are well developed and often **used in defence**.
- There is considerable **variety in dentition**.
- Some may be **digitigrade** while others are **plantigrade**.
- Some species have **four toes** and others have **five toes**.
- Claws may be **fixed or retractible**.
- **Most are strictly carvororous**.



Order: Tubulidentata

Aardvark (Family : Orycteropodidae)

- **Highly secretive** mammals and are usually **nocturnal**.
- They feed exclusively on termites and ants (**Myrmecophagy**).
- Long ears provide **acute hearing**.
- They have a very **flexible tubular snout**.
- The body is covered in **coarse hair**.
- They have **powerful limbs** with four digits on the front feet and five on the hind feet.
- The toes have **large, sharp edged claws for digging**.
- The nostrils are surrounded by dense hair that acts as a **dust filter**.



Order: Tubulidentata

Aardvark (Family : Orycteropodidae)

- They have ***continuously growing molars*** or cheek teeth with ***no incisors or canines***.
- The tooth dentine is covered in ***cementum*** and not enamel as in other animals.
- They have a long, thin, round and ***sticky tongue*** and well developed ***salivary glands***.
- Both sexes have an ***anal scent gland***.



Order: Pholidota

Pangolins (Family : Manidae)

- There is only ***one species*** in Southern Africa, the Cape Pangolin.
- Distinguished from all other mammals by their ***covering of scales***.
- These scales are formed from ***modified hair***.
- The scales provide a very ***effective armour*** and also have sharp edges.
- Pangolins can curl up into a ***tight ball*** to protect their undersides.
- They have an ***anal gland*** that secretes a foul smelling substance.
- They have ***narrow, triangular heads***.
- They have ***no teeth*** and are ***Myrmecophagous***.
- They have ***no external ears*** and the ***nostrils can be closed at will***.
- They have a ***plantigrade*** gait and ***strong claws*** for burrowing.
- They usually ***walk on their hind feet*** and use the tail for balance.



Order : Proboscidae

Elephants (Family : Elephantidae)

- The ***largest living land mammal*** and its body size increases with age.
- The large skull is ***disproportionate*** to the size of the brain. It is designed to carry the weight of the trunk and tusks.
- The skull has ***air-cell cavities*** within the bone and is relatively light.
- The skin is thick and sparsely covered with hair.
- The tusks are elongated ***upper incisor teeth***.
- The ***tusks are versatile*** and used for a number of functions.
- The ***trunk*** is used for sucking up water, dust baths, water spraying, touching each other and amplifying sounds.
- The ***top lip and the nose are fused*** and elongated to form the trunk.
- The trunk is made up of ***thousands of muscles***.



Order : Proboscidae

Elephants (Family : Elephantidae)

- The **large ears** have evolved to increase the surface area and thus aid the rate of **heat loss**.
- The ears have a large number of blood vessels and the blood cools down as the ears are waved like a fan.
- The foot structure is between **digitigrade and plantigrade**.
- They are **near-ungulates** and have **toenails** instead of hooves.
- There are **five toe nails on the front foot** and **four on the back foot**.



Order: *Perrisodactyla*

- The members of this order are characterised by having either ***one or three toes on the foot.***
- They are ***ungulates*** that walk on the ***tips of their toes.***
- They are all ***hind gut fermenters.***

This order has two families in Southern Africa:

Horses (Family : *Equidae*) – Plains zebra & Mountain Zebra.

Rhinoceros (Family : *Rhinocerotidae*) – Black Rhino & White rhino.



Order: Suriformes

- The members of this order all have ***two weight bearing toes*** on each foot.
- They are ***ungulates*** and walk on the tips of their toes.
- There are two members of the order in Southern Africa – Bushpig & the Warthog.
- They both belong to the ***Family : Suidae***.



Order : Whippomorpha

Family : Hippopotamidae

- The Hippo is the ***only representative*** of this family in Southern Africa.
- They are ***ungulates***.
- They have four ***weight bearing toes*** on each foot.
- They have a unique ***foregut fermentation digestive system***.
- They have a ***bulky*** pig-like formation with ***short legs***.
- They have an enormously ***expanded muzzle*** which is noticeably bigger in males.
- The eyes, ears and nostrils are all placed on ***top of the head***.
- Canines are ***large and tusk-like*** and grow continuously.
- Mucous glands secrete a ***reddish fluid*** that aids in sun protection.



Order : Ruminantia

This order is represented by two families:

Giraffe & Okapi (Family : *Giraffidae*)

Buffalo & Antelope (Family : *Bovidae*)



Giraffe (Family : Giraffidae)

- Large *ruminants* with *high shoulders* and *sloping hind quarters*.
- They have *no upper incisors* or canine teeth.
- There is a pair of special *skin covered horns* in both sexes.
- The tongue is very long and *prehensile*.
- The *tallest animal* (up to 5.5m)
- The neck is elongated with a short erect mane.



Order : Ruminantia

Buffalo & Antelope (Family : Bovidae)

- This family is divided up into two sub-families –

Bovinae & Antelopinae.

- Each are then broken up into *tribes*.



Order : Ruminantia

Sub-family : *Bovinae*

- **Tribe : Bovini** – African Buffalo
- **Tribe : Tragelaphini** – Bushbuck, Kudu, Nyala, Eland, Sitatunga.



Order : Ruminantia

Sub-family : **Antelopinae**

- **Tribe : Alcelaphini** – Wildebeest, Hartebeest, Blesbok, Tsessebe etc.
- **Tribe : Cephalophini** – Duikers
- **Tribe : Neotragini** – Dik-diks, Oribi, Steenbok, Grysboeks, Suni
- **Tribe : Oreotragini** – Klipspringer



Order : Ruminantia

Sub-family : **Antelopinae**

- **Tribe : Reduncini** – Reed buck, Waterbuck, Lechwe, Puku, Rhebok
- **Tribe : Antilopini** – Springbok
- **Tribe : Aepycerotini** – Impala
- **Tribe : Hippotragini** – Sable, Roan, Gemsbok



Order: Ruminantia

Antelope species in which both males and females have horns

- Blue Wildebeest
- Black Wildebeest
- African Buffalo
- Eland
- Gemsbok
- Bontebok
- Blesbok
- Springbok
- Tsessebe
- Red Hartebeest
- Lichtenstein's Hartebeest
- Sable
- Roan

Flagship Species

The 'Flagship' species of Southern Africa

- Lion
- Leopard
- African Elephant
- African Buffalo
- Black Rhino
- African Wild Dog
- Cheetah
- Spotted Hyaena
- Giraffe
- Plains Zebra
- Blue Wildebeest
- Black Wildebeest
- Hippopotamus

THANKS FOR WATCHING

